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A PERUVIAN PHENACOSAUR (SQUAMATA: IGUANIA)

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ABSTRACT. A small lizard from Venceremos, Department of San Martin, Peru, is identified as a hatchling *Phenacosaurus* and possibly the third known specimen of *Phenacosaurus orcesi* Lazell, 1969. It is the first known specimen of the genus from Peru.

INTRODUCTION

The anoline lizard genus *Phenacosaurus* was initially known only from Colombia. Its type species, *P. heterodermus,* was described by A. Duméril, 1851, in Duméril and Duméril (1851), from numerous specimens from "Nouvelle Grenade," the name of Colombia at that time (including Panama). Dunn (1944) added two more Colombian species, *P. nicefori* ("vicinity of Pamplona, Norte de Santander") and *P. richteri* ("Tabio, Cundinamarca"), and Hellmich (1949) still another, *P. paramoensis* ("Paramo de Sumapaz" at the border between Cundinamarca and Meta). The latter two have since been synonymized with *P. heterodermus* (Lazell, 1969). A new giant Colombian species has very recently been described (*P. inderenae* Rueda and Hernandez-Camacho, 1988, from Gutierrez, Department of Cundinamarca).

Specimens or species known or suspected to be from adjacent

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countries have, however, been reported. A specimen from the Sierra de Perija (Museo de Historia Natural La Salle, Caracas 4477), regarded by both Aleman (1953) and Lazell (1969) as *P. nicefori,* is from a peak (Cerro Tetari) in Zulia, Venezuela. (It is probably an undescribed species.) The Field Museum's *P. nicefori* (FMNH 5684) from "Páramo de Taná," cited by Lazell (1969), may, as Rueda and Hernandez-Camacho (1988) have commented, be from Venezuela and not Colombia, since the locality given is precisely at the border between the two countries. The latter problem is rendered moot by more recent collections, since *P. nicefori* is now known from unpublished material from Betania, State of Táchira, further inside Venezuela (specimens in the collections of the Museo de Ciencias Naturales, Caracas, and the Museum of Natural History, Kansas), and a small series of an undescribed phenacosaur has been collected by the expeditions to the Cerro de La Neblina, State of Amazonas, in the extreme south of Venezuela. (These are under study by Charles Myers.) Still another phenacosaur, a single specimen in the collection of the Museo de Ciencias Naturales La Salle, Caracas, has been collected by S. Gorzula and A. Farrera on the Massif de Chimantá, a tepuy in the State of Bolivar, in southeastern Venezuela (to be described by Williams, Prasiderio, and Gorzula).

From Ecuador, Lazell, in his 1969 revision, has described the very distinctive species *P. orcesi* on the basis of two specimens, the type from "Mt. Sumaco," Napo Province, and a paratype from "between L'Alegria [*sic*] and La Bonita," both localities in the Sucumbios Province (formerly the northwest part of the Napo Province). Only recently, specimens of another giant species of phenacosaur have been collected at La Alegria and adjacent localities (specimens in the Museo Ecuatoriano de Ciencias Naturales, the Escuela Politecnica Nacional, the National Museum of Natural History, and in the Museum of Comparative Zoology, to be reported on by EEW and collaborators).

Now a juvenile phenacosaur (MCZ 165211) has been collected in Peru at Venceremos, in the northern part of the Department of San Martin, very near the Department of Amazonas border. This juvenile, both because it is small and immature and because it is not ideally preserved, is conservatively regarded as the third known specimen of *Phenacosaurus orcesi* despite the great dis-

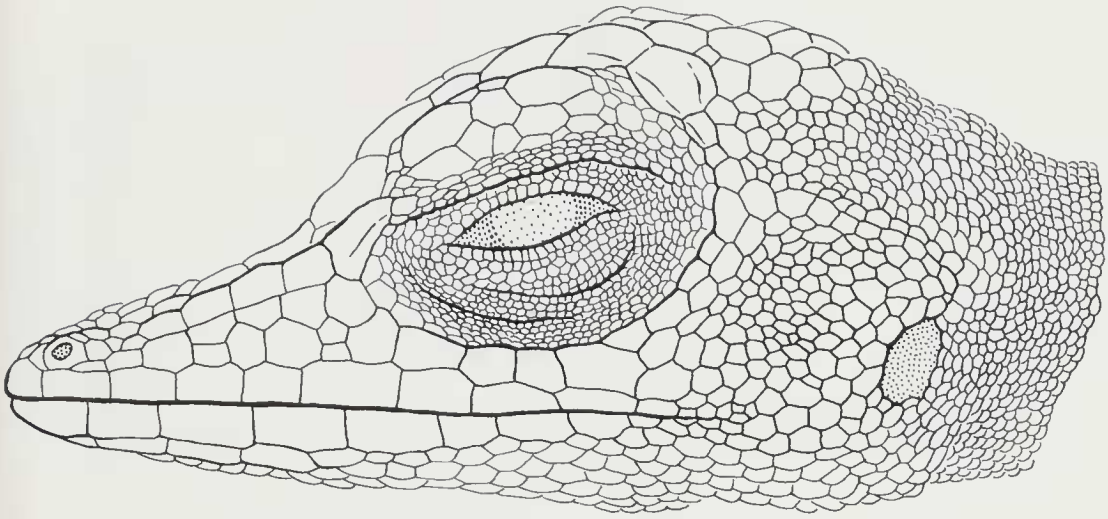

Figure 1. *Phenacosaurus orcesi* juv., MCZ 165211. Lateral view of head. (Right side reversed.)

tance between it and the nearest other specimen of that species, the type from Mt. Sumaco. The new specimen is important enough to deserve detailed description, provided below in a format elaborated from the one that has been used by the senior author in descriptions of *Anolis* over many years (see also Figs. 1–4).

DESCRIPTION

Head

No trace of a casque, not even the ridges that bound the parietal region in adults of the smaller species. All scales smooth.

Dorsal Head Scales. Antorbital region: Rostral much wider than long. Four postrostrals, these defined as all those scales posteriorly in contact with the rostral and therefore including the left circumnasal that has a narrow contact on that side. The right circumnasal is excluded from the rostral by a postrostral. Circumnasals round or ovoid, the nostril nearly central. No differentiated anterior or inferior nasals. Each circumnasal broadly in contact with the first supralabial of its side. Three scales between the circumnasals dorsally. Scales posterior to the circumnasals much smaller than the anteriormost canthals, the scales of the frontal area, or the median series of three scales anterior to the frontal area.

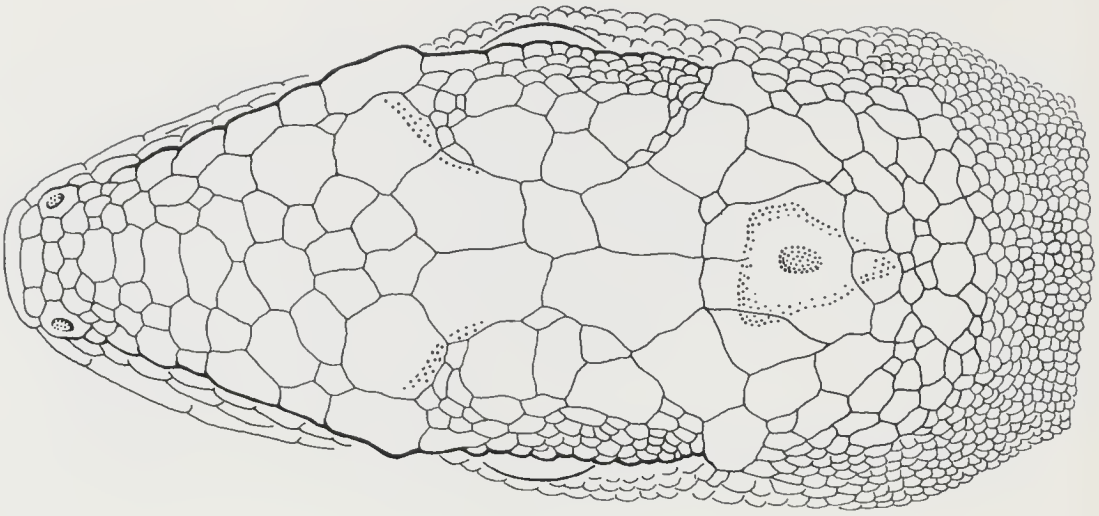

Figure 2. *P. orcesi* juv., MCZ 165211. Dorsal view of head.

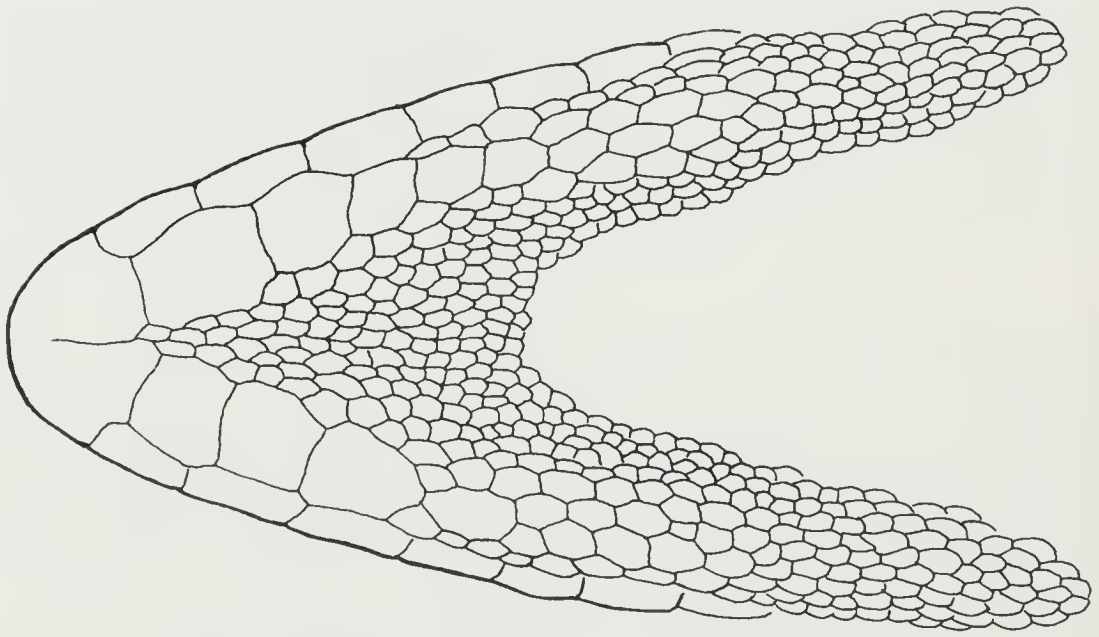

Figure 3. *P. orcesi* juv., MCZ 165211. Ventral view of head.

Frontal depression very shallow. Scales of the frontal area moderately large, polygonal, markedly varying in size. No rosette of larger scales surrounding smaller central scales. Four to six scales between the anterior canthals depending upon where the count is made.

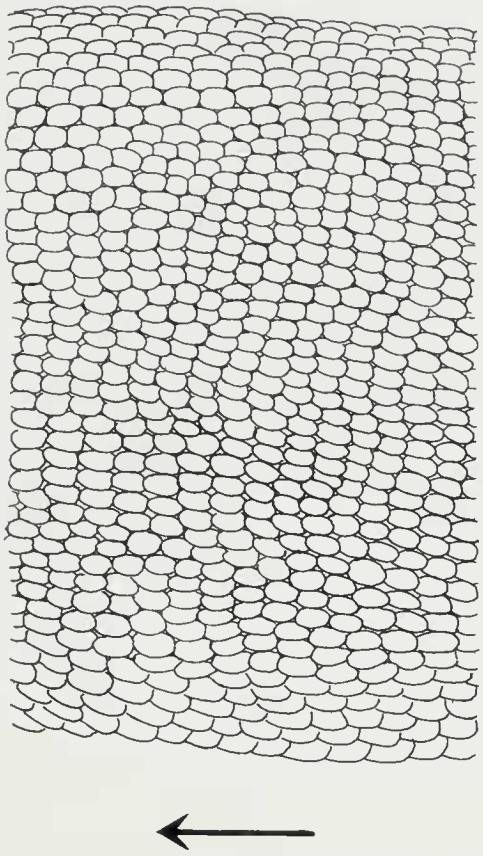

Figure 4. *P. orcesi* juv., MCZ 165211. Lateral view of body scales. Arrow points anteriorly.

Canthals five on each side, gently arched, not keeled, the first (= the posteriormost) largest on both sides, those on the right side grading smaller anteriorly, on the left side the third and fifth larger.

Orbital region: Scales of the supraorbital semicircles large, two scales on the left side in broad contact with three on the right. The two largest supraocular scales in contact with the semicircles on each side. The next largest supraocular on the right side separated from the semicircle of its side by granules; the comparable scale on the left in contact with a lateral supraocular scale. The other scales of the supraocular areas variable in size, smaller laterally. Two to four rows separate the largest supraocular scales from the superciliaries. On each side the two anteriormost superciliaries larger and elongate, the remainder subgranular.

Parietal region: A parietal eye indicated by a light spot. The interparietal apparently fused with other scales: as indicated by an anterior median partial sulcus, by the marked asymmetry of

this, the largest scale in the parietal region, and by the slight depression containing the parietal eye, which does not at all correspond to the scale boundaries. The scales lateral to the interparietal strikingly larger than those posterior to it, although these again are sharply distinct from the nape scales. About five rows in the approximate midline between the interparietal and the nape scales. A penultimate row of the posterior parietal scales markedly enlarged.

Lateral Head Scales. Loreal rows three on the right side, two on the left. Total loreals on the right side 11, on the left 10. Two preoculars (defined as the scales below the anterior corner of the eye) on each side, the uppermost in contact with the sulcus between the first and second canthals. Four suboculars on the right side, three on the left. Postoculars ill-defined, grading into the lower temporals.

Temporals in two areas, upper and lower, separated by the double row of slightly enlarged scales on the low ridge that indicates the lower border of the skeletal supratemporal fenestra.

Lower temporals smallest centrally; the upper temporals more nearly subequal but slightly larger anteriorly.

Ear many times the size of any adjacent scale, but much smaller than the (probably compound) interparietal.

Supralabials more or less elongate rectangles, seven to nine below the center of the eye.

Ventral Head Scales. Mental very deep, as deep as wide, almost wholly divided by a median sulcus, slightly indented by two very small medial gulars between the very large first sublabials. Three sublabials on each side in contact with the infralabials. Six to eight infralabials to below the center of the eye.

The anterior gulars (those posterior to the medial gulars that are in contact with the mental) small, elongate, slightly swollen, larger than the central gulars posterior to them, but not as wide. The latter becoming more granular and more imbricate near the median insertion of the dewlap but larger and still juxtaposed next to the sublabial series of each side. Lateral gulars intervening between the sublabials and the infralabials at the level of the third sublabials, after which it becomes impossible to distinguish between lateral gulars, sublabials, and the lateralmost central gulars. All gulars subgranular posteriorly alongside the dewlap.

Trunk

No trace of a middorsal crest. Dorsal and flank scales subequal, smooth or subimbricate, or (flank scales) sometimes with tiny granules visible between them. Ventrals larger, smooth, slightly convex, very weakly imbricate, in transverse rows.

Limbs

Scales smooth, anteriorly larger and imbricate on lower arm and lower leg, separated by naked skin on upper arm and thigh, posteriorly granular on upper arm and thigh but not so on lower arm and leg. Supradigitals smooth or very weakly carinate, widened transversely, lamella-like. Lamellae under phalanges ii and iii of fourth toe ca. 21.

Tail

Curving at tip as though prehensile, weakly compressed, all scales weakly keeled, without a dorsal crest, but the middorsal row imbricate and weakly dentate. Enlarged postanals (male) small but distinctly larger than surrounding scales.

Dewlap

Strongly indicated (juvenile male), distinguished by the longitudinal orientation of its scales and extending onto belly beyond the insertion of the arms. Edge scales smaller than ventrals, lateral scales larger than edge scales but, perhaps, smaller than ventrals.

Size

Snout–vent length 32 mm; tail length 43 mm.

Color in life
(from kodachromes by Russell Mittermeier)

Ground color cream mottled with brown. Dark brown streaks radiating from eye onto supralabials and toward ear. Dorsum with three broad dark brown bands variegated with lighter brown. Interstices of bands more or less vermiculate with darker brown. Limbs banded brown and cream. Small dewlap pinkish or orangish with sparse black spotting.

Locality

Collected 14 December 1983 by Russell Mittermeier near Venceremos ("few houses along the road"): "km 390–391 on the road between Rioja (6°05′S, 77°09′W) and Pedro Ruiz Gallo (= Ingenio, ca. 5°56′S, 77°59′W), approximately 91–92 km from Rioja; downhill into the forest about one km from the road, on the forest floor, within ca. 100 m of a small rainforest stream; elevation 4,750 ft in steep montane terrain, forest floor well covered with moss and humus." The locality is cloud forest with moss-covered trees and a springy, mossy floor. Much of the World Wildlife Fund film *Monkey of the Clouds* was shot in the area. The juvenile phenacosaur was the only herpetological specimen taken at Venceremos in 1983. In 1978, frogs were collected: a number of frogs not yet identified, a species of *Eleutherodactylus,* two undescribed species of *Colostethus,* and toads of the *Bufo granulosus* and *B. typhonius* complexes.

Discussion

Because this specimen is a juvenile it lacks the casque that is one of the defining characters of adult phenacosaurs, but a casque is absent in all juvenile *Phenacosaurus* (MCZ 14165: *P. heterodermus,* 30 mm SVL; EPN 2218: *P. sp.* 38 mm SVL). It also lacks the differentiated large round flat flank scales separated by granules, characteristic of *P. heterodermus,* the type species of the genus, and present also in *P. nicefori* and *P. inderenae* (but these are quite absent in the third described species, *P. orcesi*). In this juvenile there is no trace of the median crest present in most phenacosaurs (but absence as an individual variation has been demonstrated [in adults] for *P. heterodermus* [Lazell, 1969] and occurs also in the adult paratype of *P. orcesi*). The Peruvian juvenile has two loreal rows on each side and only nine loreal scales on one side, 10 on the other, the *unmodified* circumnasal scale broadly in contact with the first supralabial, and a short tail, very little longer than snout–vent length, with a curvature suggestive of prehensility. All are characters congruent with determination as a member of the genus *Phenacosaurus.* It is clearly closest to the two known adult specimens of *P. orcesi,* which it matches in the absence of enlarged flat round flank scales. Figures 5–7 display the head of the paratype of that species, which has

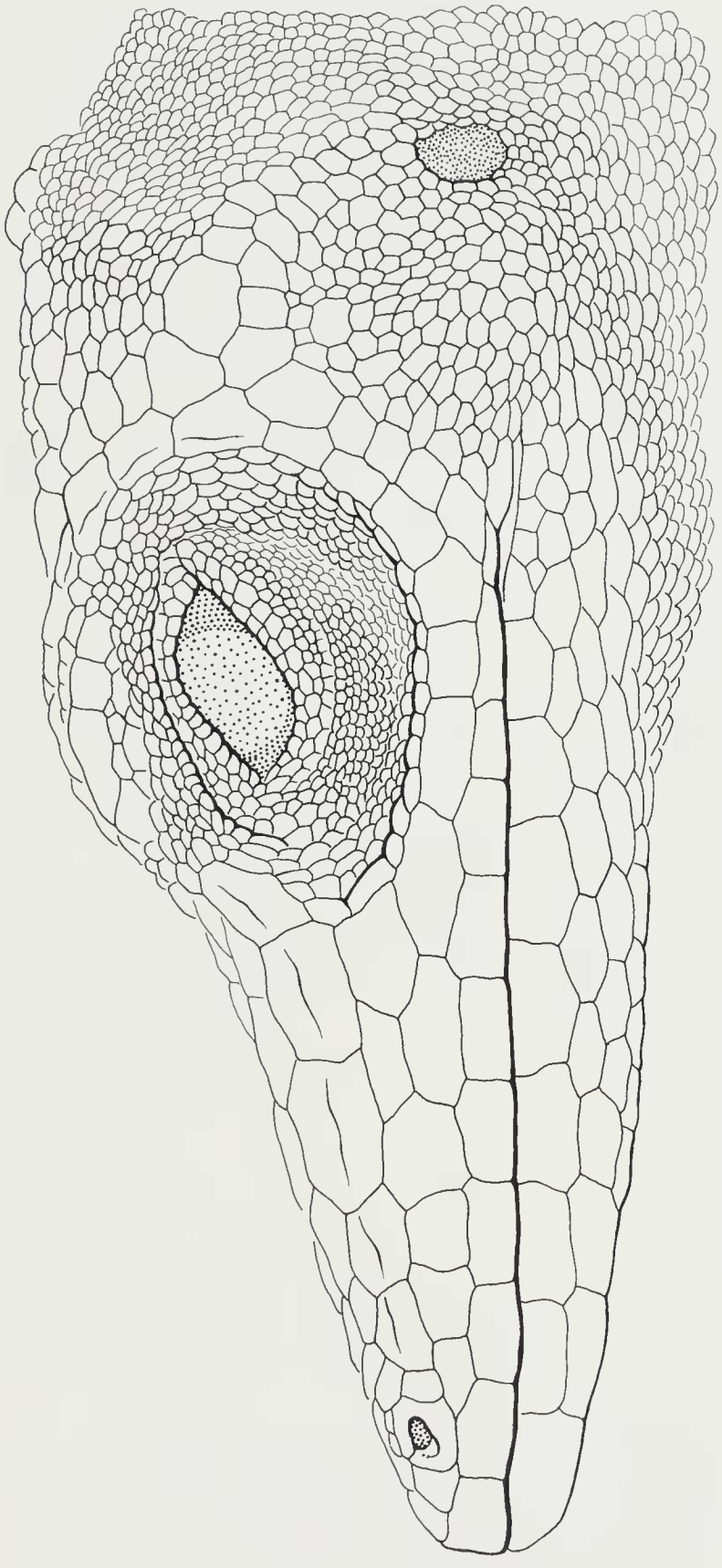

Figure 5. *P. orcesi* Paratype, USNM 166533. Lateral view of head. (Right side reversed.)

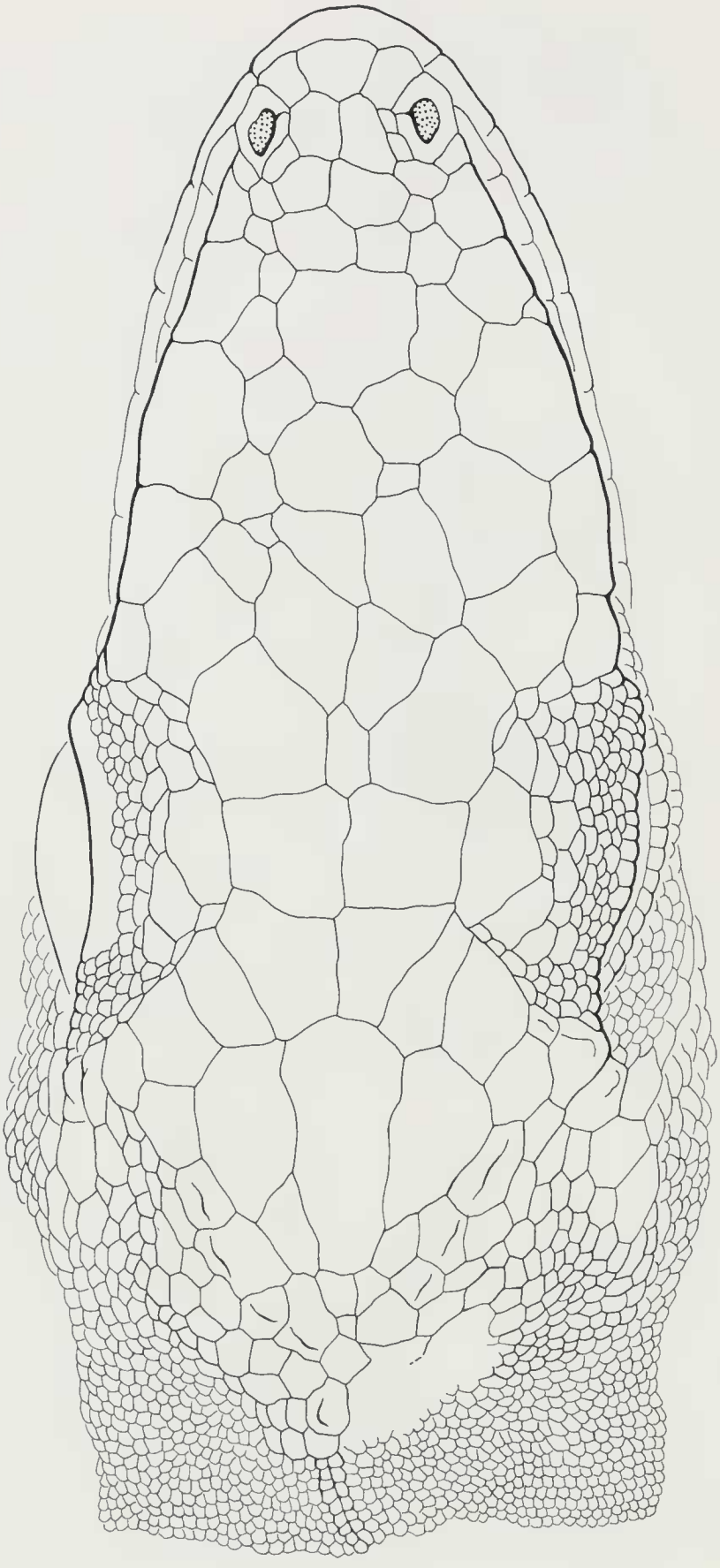

Figure 6. *P. orcesi* Paratype, USNM 166533. Dorsal view of head.

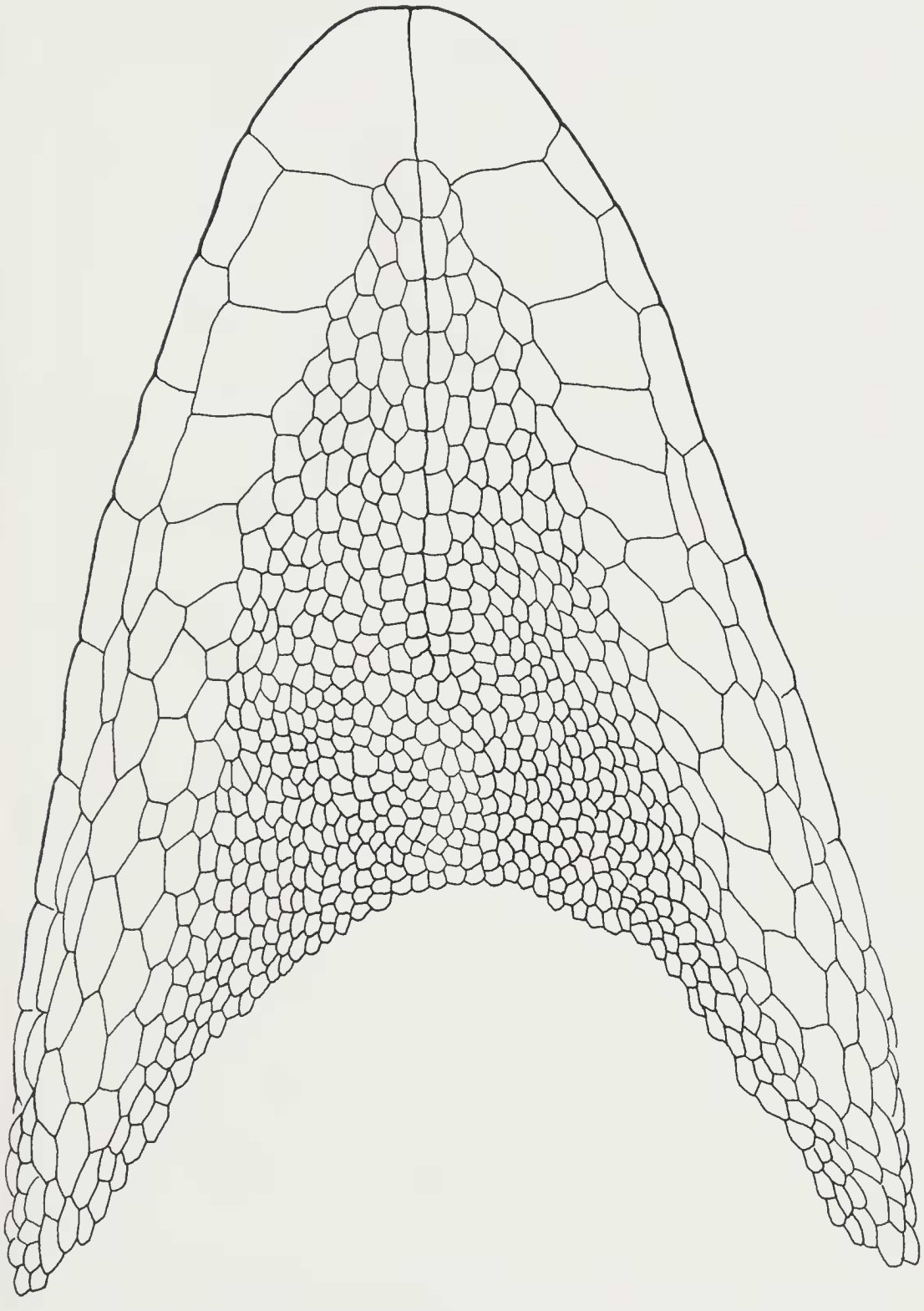

Figure 7. *P. orcesi* Paratype, USNM 166533. Ventral view of head.

Table 1. Comparative scale variations in the Peruvian phenacosaur and *orcesi* and *heterodermus*.

	Peruvian phenacosaur	*orcesi*	57 *heterodermus*
Scales between second canthals	4	4	3–6
Postrostrals	**4**	2–3	3–6
Scales between supraorbital semicircles	0	0	0–1
Scales in supraocular disk	**4**	5–6	1–6
Elongate supraciliaries	**2**	1	0–2
Loreal rows	2–3	2	1–3
Total loreals	**10-11**	6–7	3–12
Scales between interparietal and semicircles	0	0	0–2
Scales between interparietal and nape scales	**5**	4	3–8
Postmentals (including sublabials)	**4**	5–6	2–6
Scale rows in vertebral crest	0	0–1	0–2
Lamellae under phalanges ii and iii fourth toe	**21**	17–19	18–24

not been previously illustrated. (The head and body characters of the type of *P. orcesi* are figured in Lazell, 1969.)

It should be parenthetically mentioned that the issue of the validity or non-validity of the genus *Phenacosaurus* does not arise in the present context. That this Peruvian specimen belongs in the lineage that includes the species *heterodermus* is not, for us, in question. The validity of the genus *Phenacosaurus* depends upon osteological characters not observable in the present specimen and upon hypotheses of the phylogenetic significance of those characters. The placement of the Peruvian animal within the postulated lineage *orcesi, nicefori, heterodermus* depends upon external phenetic resemblances, unknown or very unusual in *Anolis,* that, in our judgment, demonstrate that these species are a clade.

There are seven differences between the juvenile and the two adult *P. orcesi,* none of these such that they could not be ascribed to the sort of individual variation that is rampant in the one well-collected species, *P. heterodermus.* These are in bold face in Table 1, which records counts for the Venceremos juvenile, the two Ecuadorian *orcesi,* and for 57 *heterodermus.* It is clear that variation in these counts exceeds species boundaries. However, cer-

Figure 8. Map showing the Ecuadorian type locality of *P. orcesi* (Mt. Sumaco) and the locality for the Peruvian juvenile (Venceremos).

tain counts generally tend to be associated with body size in anoles; thus the count of 21 for the fourth toe lamellae for the Peruvian juvenile may, possibly, indicate that the adults of this population might be nearer *heterodermus* size (maximum SVL ca. 80 mm) than *orcesi* size (known maximum SVL 67 mm).

There are, therefore, only two reasons for hesitation for recognizing the Peruvian juvenile as *P. orcesi*: (1) the fact that it is a juvenile, and (2) the very considerable range extension (more than 500 km; Fig. 8) from the southernmost (type) locality Mt.

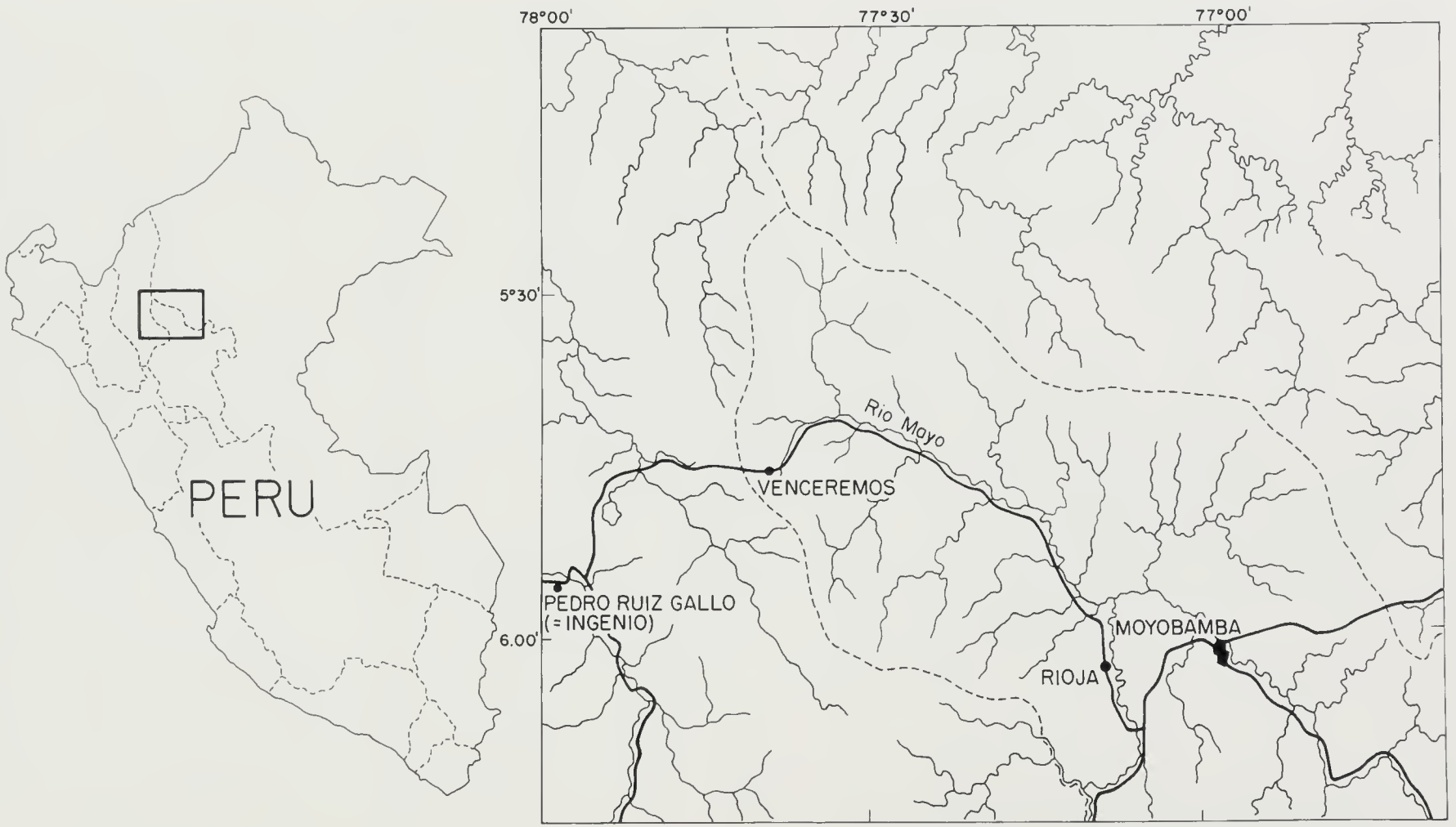

Figure 9. Left: Map to show the Venceremos area in relation to Peru as a whole. Right: Detail map to show Venceremos in relation to other localities in northern San Martin and adjacent Amazonas, Peru.

Figure 10. Photograph of the Peruvian phenacosaur in life. Photo by R. A. Mittermeier.

Sumaco, Napo Province, Ecuador (0°34′S, 77°09′W), to Venceremos, Department of San Martin, Peru (ca. 5°45′S, 77°45′W) (see Fig. 9). While *P. orcesi* is quite distinct from *P. heterodermus* and its relatives, *P. nicefori, P. inderenae,* and the undescribed giant species from Ecuador, the latter are a complex in which the species are not very sharply delimited morphologically; it is a possibility that *P. orcesi* is a complex also, and that the Peruvian juvenile is a distinct species. Provisionally we assign the Peruvian specimen (Fig. 10) to the species *P. orcesi,* but new material and much more careful collecting in the montane areas of Peru and Ecuador are clearly much to be desired.

ACKNOWLEDGMENTS

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